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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/651,431	08/30/2000	Wolfgang Streubel	BO-107	2577

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EXAMINER
WILKINS III, HARRY D

ART UNIT	PAPER NUMBER
1742	

DATE MAILED: 02/24/2003

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/651,431	STREUBEL ET AL.	
	Examiner	Art Unit	
	Harry D Wilkins, III	1742	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *15 January 2003* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,3,6,7,9 and 12-17* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,3,6,7,9 and 12-17* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☒ The proposed drawing correction filed on *21 June 2001* is: a)☒ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☒ Interview Summary (PTO-413) Paper No(s). *19* .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

1. The rejections based on Toepker et al have been withdrawn in view of the remarks filed 15 January 2003.

2. New grounds of rejection are presented below.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1, 3, 6, 7, 14, 15 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bonjean et al (US 4,787,680) in view of Hoover et al (US 4,582,259), Metals Handbook Vol. 1 and ASM Handbook Vol. 5.

Bonjean et al teach (see abstract, col. 2, lines 17-29 and col. 2, lines 66 to col.3, line 3) a method of forming a U-shaped semi-rigid axle for a vehicle that includes the step of deforming the central region of the tube to form a central longitudinal section of U-shaped cross-section with opposed ends being substantially undeformed. Bonjean et al teach (see col. 4, lines 43-47) that further total or localized heat treatment may be performed after the axle has been shaped in order to enhance the mechanical characteristics. Bonjean et al teach (see col. 3, lines 24-51) that further configuration processing is performed to prepare the deformed tube into a torsionally yielding axle.

Bonjean et al do not teach that (1) the deformation occurs by cold-forming, (2) the tube is a tempering steel, (3) the annealing, quenching and tempering treatments or

(4) the outer surface hardening treatment.

With respect to feature (1), Hoover et al teach (see abstract, figures and col. 5, line 36 to col. 6, lines 33) a conventional method of deforming a tube that is conventionally called press forming.

Therefore, it would have been obvious to one of ordinary skill in the art to have used the conventional press forming method as taught by Hoover et al to perform the deformation step of Bonjean et al because the press forming method is able to deform a portion of the tube without deforming the rest of the tube (see Hoover et al at col. 6, lines 22-24).

With respect to features (2) and (3) Metals Handbook Vol. 1 teaches (see pages 147-148 and pages 206-208) that high-Mn, low-carbon steels, such as 15B24 (from table 17 on page 151), are suitable for seamless tubes and provide excellent strength, toughness and ductility and can be subjected to quenching and tempering (i.e.-is a tempering steel). Therefore, it would have been obvious to one of ordinary skill in the art to have used a low-carbon steel for the starting seamless tube of Bonjean et al because of the beneficial strength, toughness and ductility properties of high-Mn low-carbon steels such as 15B24. Metals Handbook Vol. 1 teaches (see paragraph spanning pages 206 and 208 and 2nd and 3rd cols. of page 390) that high-Mn low-carbon steels were subjected to a standard quenching and tempering treatment. The heat treatment involves (see page 390) heating (annealing) at a suitable temperature of about 900°C, hardening by water quenching and finally tempering at a temperature of 480-600°C for desired strength and toughness.

Therefore, it would have been obvious to one of ordinary skill in the art to have applied the conventional quench and temper method as taught by the Metals Handbook Vol. 1 to the axle of Bonjean et al because the conventional quench and temper method produce a steel with excellent strength and toughness as taught by the Metals Handbook Vol. 1 at page 390.

Though the tempering step does not state a duration, it would have been within the expected skill of a routineer in the art to have selected an appropriate duration for the tempering to ensure proper toughness (the result of tempering).

With respect to feature (4), the ASM Handbook Vol. 5 teaches (see pages 708-709) that shot peening can be applied to the surface of carbon steels in order to reduce fatigue failures in parts subjected to cyclic loading, such as an axle.

Therefore, it would have been obvious to one of ordinary skill in the art to have applied an outer surface hardening method, such as shot peening, as taught by the ASM Handbook Vol. 5 to the axle of Bonjean et al because the shot peening reduces fatigue failure in parts subjected to cyclic loading.

It would have been within the expected skill of a routineer in the art to apply the annealing step as taught by Metals Handbook Vol. 1 to only the sections of the support where the desired hardness and microstructure were required as disclosed by Bonjean et al (see col. 4, lines 43-47, "localised (sic) heat treatment").

Regarding claim 3, the Metals Handbook Vol. 1 teaches (see page 390) the heating/annealing step at about 900°C, which is about (approximately) 930°C.

Regarding claims 6 and 7, the ASM Handbook Vol. 5 teaches that shot peening can be applied to carbon steels. Therefore, it would have been obvious to one of ordinary skill in the art to carry out the surface hardening by the conventional method of bombardment with steel balls (i.e.-shot peening).

Regarding claim 14, the Metals Handbook Vol. 1 teaches (see page 390) the heating/annealing step at about 900°C, which includes 902°C.

Regarding claim 15, though the claimed temperature and time for the tempering step is different from the conditions disclosed by the Metals Handbook Vol. 1, it would have been within the expected skill of a routineer in the art to have selected and optimized the known result effective variables of tempering time and temperature. Tempering time and temperature are known result effective variables as evidenced by

Regarding claim 16, Bonjean et al teach (see col. 3, lines 40-43) that the selection of the material for the axle is within the normal area of competence of an axle designer. The Metals Handbook Vol. 1 teaches (see page 151) that a standard carbon steel (tempering steel) is SAE-AISI 1524 (and 15B24) (which is equivalent to 22MnB5). Therefore, it would have been obvious to one of ordinary skill in the art to have selected the conventional steel for use in a twist beam rear axle for achieving proper mechanical properties.

5. Claims 9, 12, 13 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bonjean et al (US 4,787,680) in view of Hoover et al (US 4,582,259), the ASM Handbook Vol. 4 and ASM Handbook Vol. 5.

Bonjean et al teach (see abstract, col. 2, lines 17-29 and col. 2, lines 66 to col.3, line 3) a method of forming a U-shaped semi-rigid axle for a vehicle that includes the step of deforming the central region of the tube to form a central longitudinal section of U-shaped cross-section with opposed ends being substantially undeformed. Bonjean et al teach (see col. 4, lines 43-47) that further total or localized heat treatment may be performed after the axle has been shaped in order to enhance the mechanical characteristics. Bonjean et al teach (see col. 3, lines 24-51) that further configuration processing is performed to prepare the deformed tube into a torsionally yielding axle.

Bonjean et al do not teach that (1) the deformation occurs by cold-forming, (2) the tube is a case hardening steel or the further case hardening treatments or (3) the outer surface hardening treatment.

With respect to feature (1), Hoover et al teach (see abstract, figures and col. 5, line 36 to col. 6, lines 33) a conventional method of deforming a tube that is conventionally called press forming.

Therefore, it would have been obvious to one of ordinary skill in the art to have used the conventional press forming method as taught by Hoover et al to perform the deformation step of Bonjean et al because the press forming method is able to deform a portion of the tube without deforming the rest of the tube (see Hoover et al at col. 6, lines 22-24).

With respect to feature (2), The ASM Handbook Vol. 5 teaches (see pages 948-949) that case-hardening is a conventional process and that carburizing and quenching are performed to enable surface hardening. A steel must be a case hardening steel in

order to be case hardened. Therefore, it would have been obvious to one of ordinary skill in the art to have made the axle of Bonjean et al from a case hardening steel in order to ensure the ability of the axle to be surface hardened by a case hardening method.

With respect to feature (3), the ASM Handbook Vol. 4 teaches (see page 371) that shot peening is applied to case hardened steel in order to increase surface compressive residual stresses. This process has the effect of improving bending fatigue performance.

Therefore, it would have been obvious to one of ordinary skill in the art to have applied case-hardening and shot peening, as taught by the ASM Handbook Vols. 4 and 5, to the conventional C15 steel because the case-hardening increases the hardness of the surface of the steel as taught by the ASM Handbook Vol. 5 and the shot peening improves bending fatigue performance as taught by the ASM Handbook Vol. 4.

It would have been within the expected skill of a routineer in the art to apply the case hardening as taught by the ASM Handbook Vol. 5 to only the sections of the support where the desired hardening was required as disclosed by Bonjean et al (see col. 4, lines 43-47, "localised (sic) heat treatment").

Regarding claims 12-13, the ASM Handbook Volume 4 teaches applying the surface hardening as shot peening. Therefore, it would have been obvious to one of ordinary skill in the art to carry out the surface hardening by the conventional method of bombardment with steel balls (i.e.-shot peening).

Regarding claim 17, it would have been obvious to one of ordinary skill in the art to have selected the conventional C15 case hardening steel (ASTM A 576, see paper no. 7 and pages 162 and 163 of Metals Handbook Vol. 1) because it has specific mechanical property requirements which are desirable for a twist beam rear axle.

Response to Arguments

6. Applicant's arguments with respect to claims 1, 3, 6, 7, 9 and 12-17 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Harry D Wilkins, III whose telephone number is 703-305-9927. The examiner can normally be reached on M-Th 6:00am-4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy V King can be reached on 703-308-1146. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

Harry D Wilkins, III
Examiner
Art Unit 1742

hdw
February 20, 2003

ROY KING
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700